REMARKS

Claims 1-12 are currently pending in the instant application.

At the outset, Applicants respectfully note that the Examiner has still not enclosed a PTO Form 892 listing the references cited in the Office Action or the prior Office Action mailed on August 25, 2005 ("the prior Office Action"). Enclosed herewith, for the Examiner's convenience, is a Form PTO 1449 listing the references which have been cited, referenced and/or relied upon by the Examiner in the Office Action and/or the prior Office Action. Applicants respectfully request that the Examiner ensure that the listed references are officially made of record in the application by initialing each of the references listed on the attached Form PTO 1449 and returning an initialed copy, along with the Examiner's next official communication in this application.

In the Office Action, the Examiner maintains the rejection of claims 1-4 under 35 U.S.C. §103(a), as being obvious over U.S. Patent No. 6,136,225 of Meyer, *et al.* ("Meyer") in view of Lewis, R., *Hawley's Condensed Chemical Dictionary*, 14th Ed., John Wiley & Sons, Inc., New York, 2001 ("Hawley's"), for the reasons of record set forth in the prior Office Action. Additionally, the Examiner maintains the rejection of claims 5-6 under 35 U.S.C. §103(a), as being obvious over Meyer and Hawley's, further in view of Japanese Patent Publication No. JP08-020641 and Japanese Patent Publication No. JP06-308462 ("JP '641" and "JP '462", respectively), for the reasons set forth in the prior Office Action. The Examiner also maintains the rejection of claim 7 under 35 U.S.C. §103(a), as being obvious over Meyer and Hawley's, further in view of U.S. Patent Application Publication No. 2003/0104144 A1 of Hammond-Smith, *et al.* ("Hammond-Smith"), for the reasons of record. Finally, the Examiner also maintains the rejection of claims 8-12 as being obvious over Meyer and Hawley's, further in view of Hammond-Smith, U.S. Patent No. 6,712,992 of Prechtl, *et al.* ("Prechtl") and U.S. Patent No. 6,171,518 of Hikmet, *et al.* ("Hikmet"), for the reasons of record.

The Examiner continues to argue that Meyer discloses a polymerizable liquid crystalline compound having terminal reactive groups via which polymerization can be effected,

wherein the terminal reactive groups, Z^1 and Z^2, may be selected from various disclosed polymerizable groups which include (meth)acrylic moieties and an "epoxy." Contrary to the Examiner's argument, Meyer only specifically discloses a three-membered epoxide ring among the many possible other Z-substituents. The term "epoxide" is narrower than "epoxy." The Examiner also contends that Hawley's discloses oxetane as one kind of epoxy group. On this basis, the Examiner argues that it would have been obvious to one of ordinary skill in the art at the time Applicants' invention was made to have made a liquid crystalline polymerizable compound of Meyer wherein Z^1 is a (meth)acrylic moiety and Z^2 is an oxetanyl moiety, thus arriving at Applicants' claimed invention.

Applicants respectfully traverse the Examiner's rejection and the arguments and contentions set forth in support thereof for the following reasons. The Examiner's conclusions are wrong because: (1) the epoxide (not "epoxy") referenced in Meyer is not generic to all cyclic ethers and does not suggest the claimed oxetanyl moiety as epoxides and oxetanes are structurally and reactively different (see, *e.g.*, attached Declaration of Hitoshi Mazaki); and (2) there is no teaching or suggestion in either Meyer or Hawley's that would motivate one of ordinary skill in the art to combine the references and modify them, as suggested by the Examiner, to arrive at Applicants' claimed invention.

Applicants submit that the epoxide disclosed in Meyer does not suggest the claimed oxetanyl moiety to one of ordinary skill in the art. Epoxide is not a generic reference to all cyclic ether groups. The references to "epoxides" in Meyer and the specific depiction of the three-membered epoxide ring set forth in column 54 of Meyer are NOT a generic teaching of all cyclic ethers or "epoxy", as the Examiner contends. An epoxide group () and an oxetane group () are both structurally and reactively different from one another, as explained in Applicants' response to the prior Office Action. The strains placed on the bonds between the carbons and the oxygen in a three-membered cyclic ether (*i.e.*, epoxide) are entirely different than the strains on the bonds in a four-membered oxetane group.

Accordingly, as clearly evidenced in the enclosed Declaration of Hitoshi Mazaki, the reactivity of the two structures is vastly different and one of ordinary skill in the art would not expect the two moieties to be substitutable for one another. As shown in the enclosed Declaration, reactions which may be conducted with a three-membered epoxide group may not necessarily be carried out with a four-membered oxetane group, and *vice versa*. Specifically, as shown in the Declaration, for example in Table 3 at page 10, the synthesis of an oxetane precursor for a compound of the present invention is vastly different than the similar synthetic route using an epoxide compound. The yield for the synthetic scheme using an oxetane set forth in Paragraph 7, Section I, of the Declaration, beginning at page 3, is 68.1%. The yield for the synthetic scheme using an epoxide set forth in Paragraph 7, Section II of the enclosed Declaration, beginning at page 6, is zero (0%). Accordingly, it can clearly be seen that epoxide compounds and oxetane compounds do not react similarly.

In fact, as stated in the Conclusion (Section III at page 10 of the Declaration), a three-membered cyclic ether group (*i.e.*, an epoxide) is completely different in reaction behavior from a four-membered cyclic ether group (*i.e.*, an oxetanyl group). In both the synthesis using the oxetanyl compound (Paragraph 7, Section I) and the synthesis using an epoxide compound as a starting material (Paragraph 7, Section II), the starting materials (Compound 1 and Compound 5, respectively) were reacted in a first step with methane sulfonic acid chloride and triethylmine in diethyl ether. In a second step, the resulting intermediate compounds (Compounds 2 and 6, respectively) were reacted with p-hydroxybenzoate and anhydrous potassium carbonate. Finally, in a third step, the intermediate compounds resulting from the second step (Compound 3 and Compound 7, respectively) were reacted with potassium hydroxide and subsequently precipitated with sodium bisulphate monohydrate. However, as shown in Scheme B2 and in Table 3 at page 10 of the Declaration, the product yield was 0% when using an epoxide starting material compared to a 68.1% product yield when using the oxetane compound. The synthetic comparison set forth in the Declaration of Hitoshi Mazaki, as attached, clearly evidences the reactive differences between an epoxide and an oxetane group.

Accordingly, Applicants respectfully submit that it cannot reasonably be said that one of ordinary skill in the art would be motivated to use an oxetane group in light of a disclosure which only specifically references an epoxide.

Applicants reiterate that contrary to the Examiner's contentions, Meyer does not generically disclose "epoxy." The only reference in Meyer to a cyclic ether group is that of an epoxide which is a specific reference to a three-membered cyclic ether. In fact, in Meyer, at column 54 (cited by the Examiner), the three-membered epoxide group is specifically depicted by its molecular formula, (). There is no reference in Meyer to "epoxies" in general. Moreover, there is no generic reference whatsoever to cyclic ethers. The only reference in Meyer is specifically to epoxides. Thus, based on the structural and reactive differences between epoxides and oxetanes, it is submitted that one of ordinary skill in the art would not automatically assume substitutability based on the disclosure of one or the other.

In light of the structural and reactive differences between epoxides and oxetanes, Applicants respectfully submit that a *prima facie* case of obviousness cannot be established on the basis of the combination of Meyer and Hawley's as there is no motivation in either reference to combine the references and modify their teaching, as suggested by the Examiner, in order to arrive at Applicants' claimed invention. There are no teachings in Hawley's which would suggest that an oxetanyl moiety may be equivalently replaced with an *epoxide*. Similarly, there is no teaching in Meyer which would motivate one of ordinary skill in the art to substitute an oxetane in place of a specifically taught epoxide. Regardless of whether Hawley's identifies an oxetane as one kind of *epoxy* group, there is simply no generic disclosure in Meyer as to the inclusion of any epoxy group, other than the specific reference to "epoxides." The lack of motivation is especially apparent in light of the structural and reactive differences between the two types of compounds.

In the Office Action, the Examiner has argued that Applicants have attempted to attack the references individually, where the rejection is based on a combination of the references. Applicants respectfully note that the references are not being attacked individually. The rejections set forth by the Examiner in the Office Action are based on the combination of Meyer and Hawley's. The references are not sufficient to establish *prima facie* obviousness as the claimed invention is not taught or suggested by the Examiner's combination as no motivation to make the combination and modification necessary to arrive at Applicants' claimed invention is set forth in either of the references.

Accordingly, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness based upon Meyer and Hawley's. Additionally, as none of Hammond-Smith, Prechtl or Hikmet remedies the deficiencies of the primary combination of Meyer and Hawley's, Applicants submit that no *prima facie* case of obviousness can be established on the basis of these secondary references. Accordingly, withdrawal of each of the rejections relying on the combination of Meyer and Hawley's is respectfully requested.

In view of the remarks set forth above and the attached Declaration of Hitoshi Mazaki, Applicants submit that all pending claims patentably distinguish over the prior art of record and known to Applicants. Reconsideration, withdrawal of the rejections and a Notice of Allowance are respectfully requested.

Respectfully submitted,

Takuya Matsumoto, *et al.*

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(Date)

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ARE/rc
Enclosures – Request for Continued Examination
Declaration of Hitoshi Mazaki under 37 C.F.R. §1.132
Petition for Extension of Time (two months)
Form PTO 1449